

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 08 March 2001 (08.03.01)	
International application No. PCT/IL00/00355	Applicant's or agent's file reference ECIP/D006/WO
International filing date (day/month/year) 18 June 2000 (18.06.00)	Priority date (day/month/year) 30 June 1999 (30.06.99)
Applicant GUATA, Haim	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

28 January 2001 (28.01.01)

☐ in a notice effecting later election filed with the International Bureau on:

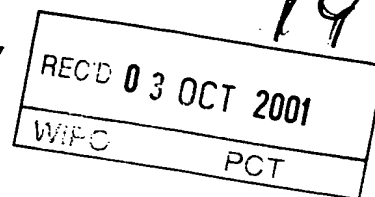
2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer C. Cupello Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

PCT



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference ECIP/D006/WO		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/IL00/00355	International filing date (day/month/year) 18/06/2000	Priority date (day/month/year) 30/06/1999	
International Patent Classification (IPC) or national classification and IPC H04L12/64			
Applicant ECI TELECOM LTD. et al.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 10 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 9 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 28/01/2001	Date of completion of this report 01.10.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Keller, M Telephone No. +49 89 2399 8807



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IL00/00355

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1,5-7,9-16	as originally filed			
2-4,8,17	as received on	23/08/2001	with letter of	13/08/2001

Claims, No.:

1-15	as received on	23/08/2001	with letter of	13/08/2001
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Drawings, sheets:

1/3-3/3	as originally filed
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2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IL00/00355

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	4-8,11,12,14,15
	No:	Claims	1,2,3,9,10,13
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-15
Industrial applicability (IA)	Yes:	Claims	1-15
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/IL00/00355

With respect to SECTION V:

1. Reference is made to the following documents:

D1 = EP-A-0 614 305 (HITACHI LTD) 7 September 1994

D2 = EP-A-0 494 687 (MITSUBISHI ELECTRIC CORP) 15 July 1992

D3 = EP-A-0 529 104 (ECI TELECOM LTD) 3 March 1993

2. In addition to the clarity objections raised in SECTION VIII of this international preliminary examination report, the subject-matter of Claims 1 to 3, 9, 10 and 13 is deemed to lack novelty (Art. 33 (1) and (2) PCT).

- 3a1. Document **D1** discloses in accordance with all features of Claim 1, a digital telecommunication station (see fig. 1, "voice/facsimile simultaneous communication apparatus"; see fig. 10 "voice/image simultaneous communication transceiver") operative in a telecommunication network (telephone network, see column 1, lines 1-14 and column 3, lines 8-20) and comprising:

- at least one detector (see fig. 1, detector is mainly formed of "system controller 1", "modem 9" and "data separator 8"; see fig. 10, detector is mainly formed of "system controller 31", "modem 9" and "data separator 8"; see also column 13, lines 48-52) operative to receive at least two different types of signals (e.g. ordinary telephone call; coded data of FAX; coded data of voice; facsimile mode; image coded data) and determine their type (see fig. 5; see column 5, line 54, to column 6, line 1 and column 6, lines 44-57; see column 9, lines 14-26, in combination with column 10, lines 1-13)
- at least one switch (see fig. 1, "21, 20"; see fig. 5, "85, 83, 84, 81, 82"; see fig. 10, "34, 35") controlled by one of said at least one detector ("1"- "9"- "8" or "31"- "9"- "8"), operative to channel signals received in accordance with the determination made by said one of the at least one detector (see column 11, line 32, to column 13, line 11);
- a first transmission means (see fig. 1, "DATA SEPARATOR 8 with its

components 83-86-81", "IMAGE DECODER 6" and "IMAGE RECORDER 4"; see fig. 10, "DATA SEPARATOR 8", "SWITCH 35", "IMAGE DECODER 33", "IMAGE DISPLAY UNIT 28", "MONITOR 30") operative to transmit the received signals along a first transmission path (see fig. 1, telephone line 14 to a displaying terminal 4; see fig. 10, antenna 25 to a displaying terminal 30), wherein signals of at least one type (e.g. voice) may be diverted from the first transmission path along which signals of the other types are transmitted, and

- a second transmission means (see fig. 5, "DATA SEPARATOR 8 with its components 84-88-82", "VOICE DECODER 17", "2-LINE / 4-LINE CONVERTER 18", "TELEPHONE SET 15"; see fig. 10, "DATA SEPARATOR 8", "VOICE DECODER 17", "LOUDSPEAKER 23") operative to transmit the diverted signals of the at least one type along a second transmission path (to an acoustic terminal ["14" with respect to fig. 1; "22" with respect to fig. 10]).

Hence, the subject-matter of Claim 1 is not new and therefore the criteria of Article 33 (1) and (2) PCT are not met.

3a2. In the view of the examiner, the subject-matter of Claim 13 (as well as that of Claim 1) is worded in such a broad manner that all of the features of this claim are found in D1 and consequently Claim 13 is assessed as not being new, contrary to the Applicant's opinion.

The subject-matter of present Claim 13 reads:

"A method for transmission of telecommunication signals of at least two different types,

the method comprising:

- i) determining the type of the signals received and distinguishing therefrom signals of at least one pre-defined type from signals of other types;
- ii) based on step i), diverting signals of a pre-defined type from a first transmission path along which signals of the other types are transmitted;
- iii) transmitting the signals of the other types along the first transmission path; and
- iv) transmitting the diverted signals along a second transmission path. "

D1 discloses this subject-matter. With respect to figures 1 or 10, information arrives at the input 14 (Telephone Line) or at the antenna 25 respectively. As shown in figures 5 and 8, the information received consists of two components, i.e. two types of signals. The first type of signal is presented by voice coded data (VOICE DATA). The second type of signal is presented by fax coded data (FAX DATA). These signals are transmitted in a multiplexed form. The task of the circuitry shown in figure 1 or 10 is to split these different types of signals and to send the signals components

- carrying the fax coded data (= image data)
 [first transmission path]
 via an image decoder 6 or 33 to an image recorder 4 or an image display unit 28 with a monitor (see figures 1 and 10) and
- carrying the voice coded data (= acoustic component)
 [second transmission path]
 via a voice decoder 17 (and a 2-Line / 4-Line converter 18) to a telephone set 15 or a loudspeaker 23 respectively (see figures 1 and 10).

The splitting of the signals is performed by a Data Separator 8 (cf. col. 5, lines 39-45) which is controlled by a system controller 1 or 31 (see fig. 1; fig.10). The system controller *determines* which kind of signals are received (cf. D1, col. 13, lines 48-52; col. 3, lines 36-43 and figure 2; col. 5, lines 49-54; col. 10, line 53, to col. 11, line 6), e.g. using the parameters related to their transmission, i.e. the expected rate. If the controller determines that fax coded data are actually received (rate = 9600 bps), then it controls the Data Separator 8 to choose the first transmission path, otherwise (rate = 4800 bps) the Data Separator 8 is controlled to choose the second transmission path for the voice coded data. Hence the circuitry of figure 1 or 10 contains an embedded detector for determining the type of the signals received since otherwise the voice/facsimile simultaneous communication apparatus would not function. In conclusion this means that all features of Claim 13 (as well as those of Claim 1) are disclosed by D1.

The Applicant has emphasized that the detector is one of the essential features of the present invention and that this detector is operative to detect the signals and determine their type to allow the diversion of the signals of certain type(s) to a different transmission path. Moreover, the Applicant is not of the opinion that the

circuitry of D1 would comprise a detector.

Although D1 does not disclose an explicitly depicted detector, the examiner is of the opinion, with reference to the explanations above, that at least an implicit detector (software based detector within the controller 1) is contained in the teaching of D1 since otherwise a distinction between fax coded data and voice coded data would not be possible.

- 3b. Document **D1** discloses in accordance with all features of independent Claim 9, a telecommunication system comprising:
- at least one transmitter (see fig. 10 "voice/image simultaneous communication *transceiver*") at at least a first end of the transmission network (see column 9, lines 18-22; see column 14, line 35, to column 15, line 34);
 - at least one receiver (see fig. 10 "voice/image simultaneous communication *transceiver*") at at least a second end of the transmission network (see column 9, lines 18-22; see column 14, line 35, to column 15, line 34); and
 - at least one digital telecommunication station of Claim 1 (**cf. point 3a**).

Hence, the subject-matter of Claim 9 is not new and therefore the criteria of Article 33 (1) and (2) PCT are not met.

- 3c. D1 discloses according to dependent Claim 3 that the digital telecommunication station further comprises at least two different pairs of compressing / decompressing devices (see column 8, lines 37-56 and column 9, lines 43-57).
- 3d. Document **D1** discloses in accordance with all features of independent Claim 10, a telecommunication system comprising:
- at least one transmitter (see fig. 10 "voice/image simultaneous communication *transceiver*") at at least a first end of the transmission network (see column 9, lines 18-22; see column 14, line 35, to column 15, line 34);
 - at least one receiver (see fig. 10 "voice/image simultaneous communication *transceiver*") at at least a second end of the transmission network (see column 9, lines 18-22; see column 14, line 35, to column 15, line 34); and
 - at least one pair of digital telecommunication stations of Claim 3 (**cf. points 3a. and 3c. in combination**).

Hence, the subject-matter of Claim 10 is not new and therefore the criteria of Article 33 (1) and (2) PCT are not met.

- 3e. Independent Claim 13 specifies the same technical features as the apparatus Claim 1, however expressed in terms of a method.
Therefore, the same objections set out for Claim 1 are also valid for independent Claim 13 (lack of novelty).
- 3f. Moreover D1 discloses according to dependent Claim 2 that the digital telecommunication station further comprises a storage capable of storing diverted signals of said at least one type (see fig. 5, "buffers 86, 87, 88, 89").
4. It should be noted that even if it could be argued that the independent Claims 1, 9, 10 and 13 were novel, based on minor differences between the features of these claims and those disclosed in document **D1**, the subject-matter of Claims 1, 9, 10 and 13 would still not involve an inventive step having regard to the disclosure of **D1**, especially as this document discloses the same object and the same type of solution as claimed in Claim 1 (Articles 33 (1) and (3) PCT).
5. The additional features of the dependent Claims 4 to 8, 11, 12, 14 and 15 either alone or in combination, do not add anything of inventive significance to the respective independent claim.

The remaining additional features of dependent Claims 4 to 8, 11, 12, 14 and 15 do not appear to contain matter which in combination with the subject-matter of Claims 1, 10 or 13 respectively, would involve an inventive step. Most of them are known, can directly be derived from the documents cited or are simply embodiments without any inventive significance of their own.

Hence dependent Claims 4 to 8, 11, 12, 14 and 15 do not involve an inventive step and therefore these claims do not meet the requirements of Article 33 (1) and (3) PCT.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/IL00/00355

With respect to SECTION VII:

- 1). The independent claims have not been properly cast in the two-part form, with those features which in combination are part of the prior art (D1) being placed in the preamble. Thus they do not meet the requirements of Rule 6.3 (b) PCT.
- 2). Reference signs in parentheses have not been inserted neither to the preamble nor to the characterising portion of the claims to increase their intelligibility. Hence, the criteria of Rule 6.2 (b) PCT are not met.
- 3). None of the documents **D1** to **D3** mentioned in the international search report have been identified in the description nor has the relevant background art disclosed therein been briefly discussed. Thus, the requirements of Rule 5.1 (a) (ii) PCT are not fulfilled.
- 4). The applicant has acknowledged a document on page 11, line 1, by the term **"incorporated herein by reference"**. This gives rise to clarity objections under Article 6 PCT since it is vague and ambiguous which technical features are referred to. Furthermore it should be noted that this kind of reference contravenes the basic requirement of each application that the invention must be comprehensible from the specification by itself. In order to overcome the clarity objection raised, either the phrase "incorporated herein by reference" could simply be deleted or the cited relevant prior art under Rule 5.1 (a)(ii) PCT could be discussed in a short summary (see furthermore PCT Gazette - Section IV, II-4.17).

With respect to SECTION VIII:

1. The present independent Claims **9** and **10** have overlapping scopes since they both refer to a telecommunication system. The various definitions of the invention given in independent Claims 9 and 10 are such that the claims as a whole are not clear and **concise**, contrary to Article 6 PCT. The claims do not include only the minimum necessary number of independent claims in any one category, with dependent claims as appropriate (Rule 6.4 (a)-(c) PCT).

- 1b. The Applicant has emphasized in his letter of 13.08.2001 that "neither Claim 9 nor Claim 8 are independent claims ...". This consideration is not shared by the examiner.

The scope of protection of Claim 1 or Claim 3 respectively is directed to "a digital telecommunication station". Claims 9 and 10 have a totally different scope of protection which is directed to "a telecommunication system".

Moreover, the wording of Claims 9 (or 10 respectively) itself does not contain an explicit dependance on any one of claims 1 to 8 (cf. presentation in dependent Claims 2 to 8, "...station *according to* Claim ..."). Claim 9 merely defines a system which uses at least one digital telecommunication station of Claim 1, and Claim 10 merely defines a system which uses at least one pair of digital telecommunication stations of Claim 3.

Finally, the requirements of Rule 6.4 PCT are not met. A dependent claim is any claim which includes all the features of one or more other claims **and then** states the additional features claimed. Although Claims 9 or 10 respectively include all features of the digital telecommunication station according to Claim 1 or Claim 3 respectively, Claim 9 (or 10 respectively) does not specify additional features of the digital telecommunication station but parts of the system; these parts are outside of the digital telecommunication station and thus are not additional features of the digital telecommunication station. Hence, Claim 9 (or Claim 10 respectively) is not a dependent claim in the sense of Rule 6.4 PCT.

2. Independent Claim 13 shall presumably refer to "a **pre-defined type**" in the penultimate line on page 20 (clarity -Art. 6 PCT).

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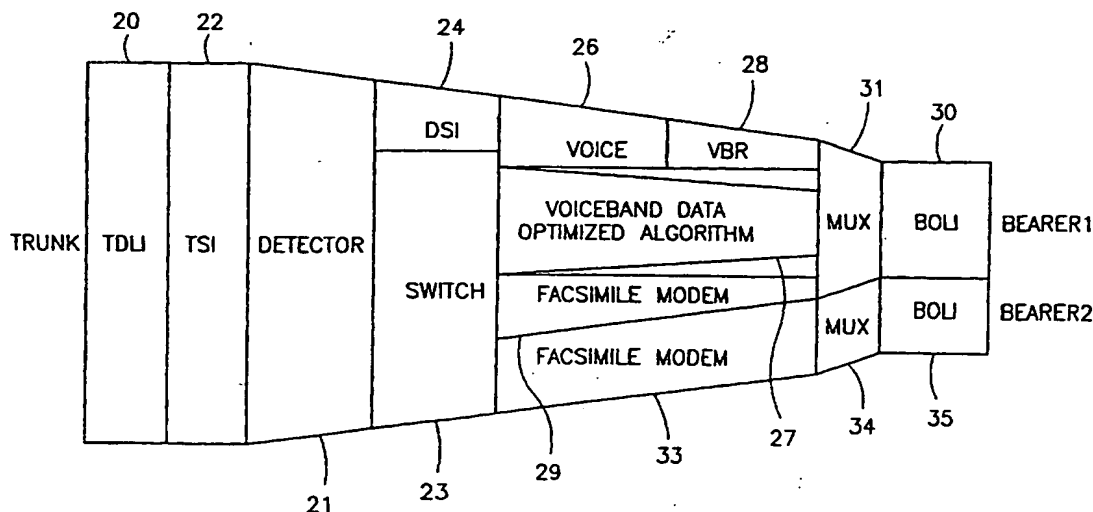
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Published:

- With international search report.
- Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: HANDLING DIFFERENT TYPES OF TELECOMMUNICATION SIGNALS



(57) Abstract: A digital telecommunication station is provided, operative in a telecommunication network to receive at least two different types of signals and divert signals of at least one of these types from the transmission path along which signals of the other types are transmitted.

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growing, and since facsimile signals are transmitted via DCME systems when compressed as voiceband data, the overall compression rate that can be achieved for DCME systems approaches 3:1 ratio. When using more advanced encoding
5 algorithms such as LD-CELP and CS-ACELP, higher compression rates may be achieved, as the typical overall compression rates are 8:1 and 16:1, respectively. Nevertheless, in view of the developing traffic load in telecommunication systems, there is a constant strive for better utilization of the
10 network resources available which in turn will allow to reduce communication costs while maintaining required qualities of service.

Therefore, it is understandable why solutions for better utilization of resources both in TDM and non-TDM
15 systems, such as IP systems, are to be found.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to
20 provide a novel digital telecommunication station capable of transmitting various signals.

It is another object of the present invention to provide a digital communications system utilizing
efficiently the resources available for communication
25 transmissions by diverting less urgent signals based on their type, to another transmission path, thereby increasing the bandwidth available at the main transmission path for the transmission of more urgent signals.

Yet another object of the present invention is to
30 provide a method for handling different types of communication traffic.

Further objects and features of the invention will become apparent to those skilled in the art, from the following description and the accompanying drawings.

35 In accordance with a first embodiment of the present invention there is provided a digital telecommunication

station operative in a telecommunication network and comprising:

at least one detector operative to receive at least two different types of signals and determine their type;

5 at least one switch controlled by one of said at least one detector, operative to channel signals received in accordance with the determination made by said one of the at least one detector;

10 a first transmission means operative to transmit the received signals along a first transmission path, wherein signals of at least one type may be diverted from the first transmission path along which signals of the other types are transmitted; and

15 a second transmission means operative to transmit the diverted signals of the at least one type along a second transmission path.

The term "telecommunication network", as will be used hereinafter, should be understood to encompass the various types of networks known in the art, such as TDM, synchronous and asynchronous transfer networks, IP networks, IP frame relaying networks and any other applicable communication networks.

25 The term "different types of signals" as used herein, should be understood to encompass both signals belonging to different groups of signals e.g. voice signals, facsimile signals, data signals, voiceband data signals and video signals, as well as signals of the same group having different quality, e.g. voice signals that are adapted to different Quality of Service ("QoS").

30 In accordance with the present invention, the telecommunication station is provided with a detector to determine the type of the signals received and a switch to channel these signals in accordance with their type. However, in some cases, the use of such a detector and a switch may be avoided when the transmission of signals of certain type(s),
35 is received with a priori knowledge of

their type. For example, when a pre-defined trunk is assigned only for delivering a specific type of signals, the fact that a call arrives via this trunk is enough for automatic recognition of the signals' type, and the following handling is carried out accordingly. The present invention should be understood also to encompass this mode of operation.

The process of diverting the signals may be considered as belonging to one of two main types of diversions that are encompassed by the present invention. The first type of diversion is achieved by delaying the diverted signals (e.g. by storing them in a buffer memory) and forwarding them along the first transmission path towards the receiving end at a later stage. The other type of diversion is carried out by transmitting the diverted signals along a different (second) transmission path, with or without delaying their transmission along that second transmission path.

One of the major advantages offered by the present invention is the enhancement of the network real time traffic performance as well as its capacity. Diverting part of the traffic carried along a bearer (the first transmission path), results in increasing bandwidth availability for e.g. transmitting additional voice calls, and consequently in the increase of the overall system performance.

According to yet another preferred embodiment of the invention, the second transmission path to which some of

least one receiving apparatus at at least a second end of the transmission network. The telecommunication system further comprises at least one digital telecommunication station of the type described above.

5 In accordance with still another preferred embodiment of the invention, a pair of telecommunication stations in the communication system is selectively operated.

By a further embodiment of the present invention at least one of the digital telecommunication stations in the digital
10 communication system is further provided with an option of establishing a communication connection with more than two other digital telecommunication stations. Preferably, such a station is adapted to establish a communication with a plurality of digital telecommunication stations each located
15 at a different part of a telecommunication network. By another embodiment of the present invention, all or part of the transmissions transmitted by a digital telecommunication station, is received in parallel by at least two other digital telecommunication stations.

20 According to another aspect of the present invention there is provided a method for transmission of telecommunication signals of at least two different types, the method comprising:

A method for transmission of telecommunication signals of at
25 least two different types, the method comprising:

- i) determining the type of the signals received and distinguishing therefrom signals of at least one pre-defined type from signals of other types;
- ii) based on step i), diverting signals of a per-defined
30 type from a first transmission path along which signals of the other types are transmitted;
- iii) transmitting the signals of the other types along the first transmission path; and
- iv) transmitting the diverted signals along a second
35 transmission path.

This type of operation allows the major part of the TDM network bandwidth to be assigned for voice transmission which is sensitive to delay, variations in delay periods as well as loss of data, while other
5 traffic such as facsimile transmissions, less sensitive to delays, is transferred to the IP network.

Claims:

1. A digital telecommunication station operative in a telecommunication network and comprising:
 - at least one detector operative to receive at least
 - 5 two different types of signals and determine their type;
 - at least one switch controlled by one of said at least one detector, operative to channel signals received in accordance with the determination made by said one of the at least one detector;
 - 10 a first transmission means operative to transmit the received signals along a first transmission path, wherein signals of at least one type may be diverted from the first transmission path along which signals of the other types are transmitted; and
 - 15 a second transmission means operative to transmit the diverted signals of the at least one type along a second transmission path.
2. A digital telecommunication station according to
- 20 Claim 1, further comprising a storage capable of storing diverted signals of said at least one type.
3. A digital telecommunication station according to Claim 1, further comprising at least two different pairs
- 25 of compressing/decompressing devices.
4. A digital telecommunication station according to Claim 1, wherein said signals of the at least one type to be diverted are facsimile signals.
- 30 5. A digital telecommunication station according to Claim 4, further comprising a device for demodulating/re-modulating said facsimile signals.

6. A digital telecommunication station according to Claim 5, wherein said demodulating/re-modulating device comprises facsimile signal demodulator/re-modulator and forward error correction apparatus wherein the forward error correction apparatus is operative to protect the output of the facsimile demodulator.

7. A digital telecommunication station according to Claim 1, wherein said signals of the at least one type to be diverted are signals used for a service that requires a lower class of quality.

8. A digital telecommunication station according to Claim 3 and further comprising:

15 first identifier for determining whether the signals received are of a digital compressed form;

second identifier for determining whether the transmission path along which the signals will be transmitted includes at least one further operative means adapted for decompressing the signals when being transmitted in their compressed form;

third transmission means operative in response to a determination made by the second identifier that the transmission path does not include at least one further operative means adapted for decompressing the signals when being transmitted in their compressed form; and

forth transmission means operative in response to a determination made by the second identifier that the transmission path does include at least one further operative means adapted for decompressing the signals being transmitted in their compressed form into the decompressed digital output signals.

9. A telecommunication system comprising:

at least one transmitter at at least a first end of the transmission network;

at least one receiver at at least a second end of the transmission network; and

5 at least one digital telecommunication station of Claim 1.

10. A telecommunication system comprising:

at least one transmitter at at least a first end of the transmission network;

at least one receiver at at least a second end of the transmission network; and

at least one pair of digital telecommunication stations of Claim 3.

15

11. A telecommunication system according to Claim 10, wherein at least one pair of telecommunication stations is selectively operated.

20 12. A telecommunication system according to Claim 9, wherein said at least one of digital telecommunication station is capable of establishing a communication connection with more than two digital communication stations.

25

13. A method for transmission of telecommunication signals of at least two different types, the method comprising:

i) determining the type of the signals received and distinguishing therefrom signals of at least one pre-defined type from signals of other types;

30 ii) based on step i), diverting signals of a per-defined type from a first transmission path along which signals of the other types are transmitted;

iii) transmitting the signals of the other types along the first transmission path; and
iv) transmitting the diverted signals along a second transmission path.

5

14. A method according to Claim 13, wherein the diverted signals are stored and transmitted at a later stage via said first transmission path.

10

15. A method according to Claim 14, wherein the diverted signals are stored in a storage means prior to their transmittal along a second transmission path.

growing, and since facsimile signals are transmitted via DCME systems when compressed as voiceband data, the overall compression rate that can be achieved for DCME systems approaches 3:1 ratio. When using more advanced
5 encoding algorithms such as LD-CELP and CS-ACELP, higher compression rates may be achieved, as the typical overall compression rates are 8:1 and 16:1, respectively. Nevertheless, in view of the developing traffic load in telecommunication systems, there is a constant strive for
10 better utilization of the network resources available which in turn will allow to reduce communication costs while maintaining required qualities of service.

Therefore, it is understandable why solutions for better utilization of resources both in TDM and non-TDM
15 systems, such as IP systems, are to be found.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention
20 to provide a novel digital telecommunication station capable of transmitting various signals.

It is another object of the present invention to provide a digital communications system utilizing efficiently the resources available for communication
25 transmissions.

Yet another object of the present invention is to provide a method for handling different types of communication traffic.

Further objects and features of the invention will
30 become apparent to those skilled in the art, from the following description and the accompanying drawings.

In accordance with a first embodiment of the present invention there is provided a digital telecommunication

station operative in a telecommunication network and comprising:

at least one detector operative to receive at least two different types of signals and distinguish therebetween;

at least one switch controlled by said at least one detector, operative to channel the signals in accordance with the distinction made by said at least one detector; and

a first transmission means operative to transmit the received signals along a first transmission path, wherein signals of at least one type may be diverted from the first transmission path along which signals of the other type(s) are transmitted.

The term "telecommunication network", as will be used hereinafter, should be understood to encompass the various types of networks known in the art, such as TDM, synchronous and asynchronous transfer networks, IP networks, IP frame relaying networks and any other applicable communication networks.

The term "different types of signals" as used herein, should be understood to encompass both signals belonging to different groups of signals e.g. voice signals, facsimile signals, data signals, voiceband data signals and video signals, as well as signals of the same group having different quality, e.g. voice signals that are adapted to different Quality of Service ("QoS").

In accordance with the present invention, the telecommunication station is provided with a detector to determine the type of the signals received and a switch to channel these signals in accordance with their type. However, in some cases, the use of such a detector and a switch may be avoided when the transmission of signals of certain type(s), is received with a priori knowledge of

their type. For example, when a pre-defined trunk is assigned only for delivering a specific type of signals, the fact that a call arrives via this trunk is enough for automatic recognition of the signals' type, and the following handling is carried out accordingly. The present invention should be understood also to encompass this mode of operation.

Optionally, the digital telecommunication station of the present invention further comprises a second transmission means operative to transmit signals diverted from the first transmission path along a second transmission path.

The process of diverting the signals may be considered as belonging to one of two main types of diversions that are encompassed by the present invention. The first type of diversion is achieved by delaying the diverted signals (e.g. by storing them in a buffer memory) and forwarding them along the first transmission path towards the receiving end at a later stage. The other type of diversion is carried out by transmitting the diverted signals along a different (second) transmission path, with or without delaying their transmission along that second transmission path.

One of the major advantages offered by the present invention is the enhancement of the network real time traffic performance as well as its capacity. Diverting part of the traffic carried along a bearer (the first transmission path), results in increasing bandwidth availability for e.g. transmitting additional voice calls, and consequently in the increase of the overall system performance.

According to yet another preferred embodiment of the invention, the second transmission path to which some of

least one receiving apparatus at at least a second end of the transmission network. The telecommunication system further comprises at least one digital telecommunication station of the type described above.

5 In accordance with still another preferred embodiment of the invention, a pair of telecommunication stations in the communication system is selectively operated.

10 By a further embodiment of the present invention at least one of the digital telecommunication stations in the digital communication system is further provided with an option of establishing a communication connection with more than two other digital telecommunication stations. Preferably, such a station is adapted to establish a
15 communication with a plurality of digital telecommunication stations each located at a different part of a telecommunication network. By another embodiment of the present invention, all or part of the transmissions transmitted by a digital telecommunication
20 station, is received in parallel by at least two other digital telecommunication stations.

According to another aspect of the present invention there is provided a method for transmission of telecommunication signals of at least two different
25 types, the method comprising:

- i) distinguishing signals of at least one pre-defined type from signals of other types;
- ii) based on step i), diverting signals of a pre-defined type from a first transmission path along
30 which signals of the other types are transmitted;
- iii) transmitting the signals of the other types along the first transmission path; and
- iv) transmitting the diverted signals.

This type of operation allows the major part of the TDM network bandwidth to be assigned for voice transmission which is sensitive to delay, variations in delay periods as well as loss of data, while other traffic such as facsimile transmissions, less sensitive to delays, is transferred to the IP network.

It is to be understood that the above description only includes some embodiments of the invention and serves for its illustration. Numerous other ways of managing various types of compressed signals in telecommunication networks may be devised by a person skilled in the art without departing from the scope of the invention, and are thus encompassed by the present invention.

Claims:

1. A digital telecommunication station operative in a telecommunication network and comprising:

at least one detector operative to receive at least
5 two different types of signals and distinguish therebetween;

at least one switch controlled by said at least one detector, operative to channel signals received in accordance with the distinction made by said at least one
10 detector; and

a first transmission means operative to transmit the received signals along a first transmission path, wherein signals of at least one type may be diverted from the first transmission path along which signals of the other
15 types are transmitted.

2. A digital telecommunication station according to Claim 1, further comprising a storage capable of storing diverted signals of said at least one type.
20

3. A digital telecommunication station according to Claim 1, further comprising a second transmission means capable of transmitting diverted signals of said at least one type via a second transmission path.
25

4. A digital telecommunication station according to Claim 1, further comprising at least two different pairs of compressing/decompressing devices

5. A digital telecommunication station according to Claim 1, wherein said signals of the at least one type to be diverted are facsimile signals.
30

6. A digital telecommunication station according to Claim 5, further comprising a device for demodulating/re-modulating said facsimile signals.
- 5 7. A digital telecommunication station according to Claim 6, wherein said demodulating/re-modulating device comprises facsimile signal demodulator/re-modulator and forward error correction apparatus wherein the forward error correction apparatus is operative to protect the
10 output of the facsimile demodulator.
8. A digital telecommunication station according to Claim 1, wherein said signals of the at least one type to be diverted are signals used for a service that requires
15 a lower class of quality.
9. A digital communication station according to Claim 4 and further comprising:
- 20 first identifier for determining whether the signals received are of a digital compressed form;
- second identifier for determining whether the transmission path along which the signals will be transmitted includes at least one further operative means adapted for decompressing the signals when being
25 transmitted in their compressed form;
- third transmission means operative in response to a determination made by the second identifier that the transmission path does not include at least one further operative means adapted for decompressing the signals
30 when being transmitted in their compressed form; and
- forth transmission means operative in response to a determination made by the second identifier that the transmission path does include at least one further operative means adapted for decompressing the signals

being transmitted in their compressed form into the decompressed digital output signals.

10. A telecommunication system comprising:

5 at least one transmitter at at least a first end of the transmission network;

at least one receiver at at least a second end of the transmission network; and

10 at least one digital telecommunication station of Claim 1.

11. A telecommunication system comprising:

at least one transmitter at at least a first end of the transmission network;

15 at least one receiver at at least a second end of the transmission network; and

at least one pair of digital telecommunication stations of Claim 4.

20 12. A telecommunication system according to Claim 11, wherein at least one pair of telecommunication stations is selectively operated.

13. A telecommunication system according to Claim 10, 25 wherein said at least one of digital telecommunication station is capable of establishing a communication connection with more than two digital communication stations.

30 14. A method for transmission of telecommunication signals of at least two different types, the method comprising:

i) distinguishing signals of at least one pre-defined type from signals of other types;

ii) based on step i), diverting signals of a per-defined type from a first transmission path along which signals of the other types are transmitted;

iii) transmitting the signals of the other types
5 along the first transmission path; and

iv) transmitting the diverted signals.

15. A method according to Claim 14, wherein the diverted
signals are transmitted along a second transmission path.
10

16. A method according to Claim 14, wherein the diverted
signals are stored and transmitted at a later stage via
said first transmission path.

15 17. A method according to Claim 15, wherein the diverted
signals are stored in a storage means prior to their
transmittal along a second transmission path.

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference ECIP/D006/W0	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/IL 00/ 00355	International filing date (day/month/year) 18/06/2000	(Earliest) Priority Date (day/month/year) 30/06/1999
Applicant ECI TELECOM LTD. et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of Invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☒ because this figure better characterizes the invention.

2

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IL 00/00355

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04L12/64

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04L H04J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 614 305 A (HITACHI LTD) 7 September 1994 (1994-09-07)	1-6, 8, 10-12, 14-17
A	column 1, line 35 -column 2, line 20; claims 1-3; figures 1,4,5 ---	9
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X	EP 0 529 104 A (ECI TELECOM LTD) 3 March 1993 (1993-03-03) column 2, line 33 -column 3, line 16 column 3, line 51 - line 55 -----	1, 5-7, 14-17



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

1 November 2000

Date of mailing of the international search report

10/11/2000

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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